Curriculum Development in Health Physics and Nuclear Engineering - Year 2

Executive Summary

Louisiana State University (LSU), in partnership with Entergy Corporation and The Shaw Group, is in the process of implementing a workforce development program to train students to work in the nuclear power industry. With an emphasis in Health Physics and Nuclear Engineering (NE), the program involves a collaboration between LSU's Departments of Physics & Astronomy and Mechanical Engineering. The goal is to design and implement the curriculum, establish student laboratories, and recruit new faculty. The industry partners will contribute technical expertise and advice, internships for students and jobs for the program's graduates, and funding. In Physics, efforts are concentrated on Health Physics, Fundamental Nuclear Physics, and Radiation Detector Development. In Nuclear Engineering, the emphases are on Thermal/Fluid Transport and Plant Design. Both the Health Physics and the Nuclear Engineering program will train undergraduates and Masters' students. LSU operated a very successful Nuclear Engineering and Health Physics program for over 40 years. Although the program has not been active since 1999, the required courses are still authorized. With relatively straightforward upgrading of the curriculum, a new Nuclear Engineering concentration has been approved (initial courses were taught in spring 2010), and the program has restarted quickly. Revamping of the laboratories is currently underway, and recruitment of new faculty will start in fall 2010. The initial goal is to train 30 graduates a year. The request for second-year continuation funding is to continue modernizing and upgrading the curriculum, introduce updated courses to reflect the current state-of-the-art and future trends, and establish modern laboratories for our Engineering and Physics students.

We are currently in the process of redesigning our Nuclear Science 3411 course ("Fundamentals of Nuclear Radiation Science") for fall 2010. This is a core course, newly developed, to be taken by both Health Physics and Nuclear Engineering students. We have purchased new radiation detection equipment (NaI scintillator-photomultiplier tube units, pulse counting electronics, sources) for our student labs and will include those in the courses starting in fall 2010. Our Mechanical Engineering (ME) laboratory course (ME3603) will be updated with a new experiment focusing on radiation detection related to Nuclear Engineering. This experiment will partially rely on equipment from MEDP4331, with new content relevant to equipment design and electronic control of detectors, and thus will also use additional equipment purchased from NRC funds. NE course NS-4527 "Reactor Theory and Design" is a core course for the NE concentration taught by a new instructor in ME with industry ties in spring 2010; this will continue to be offered. NE course ME4663 "Nuclear Power Plant Engineering" retains its original intent as a dual-level course – a technical elective for the undergraduate NE concentration and a core course for the graduate level. The latter will now be implemented based on an existing course in ME, but will receive substantial updating and redesign. NE course ME4933 "Welding and Joint Technology" will be newly developed as an elective for the NE concentration. It will focus on these technologies with special emphasis on components and techniques used in the nuclear power industry. The plan is to offer it in fall 2010.

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